WHAT IS CLAIMED IS:

1. An apparatus for monitoring/correcting a wavelength path in a transparent OXC (optical cross-connect) device of a wavelength-division-multiplexing optical-communication network, the apparatus comprising:

a path-information-generating section for generating a path-monitoring information for a subsequent determination of each input port and each switching path of input-optical signals;

a plurality of optical couplers for coupling signal outputs from a plurality of wavelength-division demultiplexers with the path-monitoring-information generated by the path-information-generating section;

a plurality of optical switches for switching signal outputs from the optical couplers;

a plurality of wavelength-division multiplexers for multiplexing signal outputs from the optical switches;

a path-information-detecting section for detecting the path-monitoring information from signal outputs from the wavelength-division multiplexers; and,

a path-control section for comparing the path-monitoring information detected by the path-information-detecting section with a predetermined optical-switching information for determining a switching error in the wavelength path.

2. The apparatus as claimed in claim 1, wherein the path-information-generating section comprises:

a plurality of frequency generators for generating a plurality of predetermined frequencies used to discriminate each input-optical signal;

a plurality of laser diodes for modulating each frequency generated from the frequency generators; and,

a plurality of optical-delay modules for delaying the modulated frequency in sequence.

3. The apparatus as claimed in claim 2, wherein each of the optical-delay modules comprises:

a optical coupler for distributing each modulated frequency; and

a plurality of fiber-delay lines for delaying and outputting the distributed frequencies in order according to predetermined intervals.

4. The apparatus as claimed in claim 1, wherein the path-information-generating section comprises:

a plurality of input-data-pattern generators for generating a predetermined bit data used to discriminate each path of the input optical signals;

a plurality of laser diodes for modulating the predetermined bit data; and,

a plurality of optical-delay modules for delaying the modulated bit data in time sequence.

5. The apparatus as claimed in claim 4, wherein each of the optical-delay modules comprises:

a optical coupler for distributing each modulated frequency; and

a plurality of fiber-delay lines for delaying and outputting the distributed frequencies in order according to predetermined intervals.

6. The apparatus as claimed in claim 1, wherein the path-information-generating section comprises:

a plurality of CDM code generators for generating a plurality of predetermined CDM codes used to discriminate each path of the input-optical signals;

a plurality of laser diodes for modulating the CDM codes; and,

a plurality of optical-delay modules for delaying the modulated CDM codes in sequence.

7. The apparatus as claimed in claim 6, wherein each of the optical-delay modules comprises:

a optical coupler for distributing each modulated frequency; and

a plurality of fiber-delay lines for delaying and outputting the distributed frequencies in order according to predetermined intervals.

8. The apparatus as claimed in claim 1, wherein the path-information-detecting section comprises:

a plurality of optical circulators for detecting the path-monitoring information from the output of the wavelength-division multiplexers;

a plurality of fiber Bragg gratings for outputting data output from the optical circulators, with the exception of the path-monitoring information;

a plurality of optical receivers for converting the output of the optical circulators into corresponding electric signals; and,

an input-port/time-slot-detection unit for detecting the input port and time–slot-position information from the converted electric signals.

9. The apparatus as claimed in claim 8, wherein the input-port/time-slot detection unit comprises:

a plurality of electric-signal distributors arranged to receive the converted electrical signals and for distributing input-discrimination-wavelengths according to a frequency ;

a plurality of band-pass-filter arrays for detecting the frequency from the wavelengths distributed by the electric-signal distributors;

a plurality of time-slot detectors for detecting a position information of time slots from the wavelength signals outputted from the band-pass-filter arrays; and,

an OXC-switching-information generator for generating a switched table using the detected frequency information and the time-slot-position information.

10. The apparatus as claimed in claim 8, wherein the input-port/time-slot-detection unit comprises:

a plurality of input pattern detectors for detecting an input-port information from the converted electric signals;

a plurality of time-slot detectors for detecting a position information of time slots from the signal outputs from the input-pattern detectors; and,

an OXC-switching-information generator for generating a switched table according to the detected input-port information and the time-slot-position information.

11. The apparatus as claimed in claim 8, wherein the input-port/time-slot-detection unit comprises:

a plurality of CDM code detectors for detecting input-port information from the converted electric signals;

a plurality of time-slot detectors for detecting a position information of time slots from the signal outputs from the CDM code detectors; and,

an OXC-switching-information generator for generating a switched table according to the detected input-port information and the time-slot-position information.

12. The apparatus as claimed in claim 1, wherein the path-control section comprises:

a switching-table unit for storing an optical-signal-switching information;

a comparator for comparing the detected path-monitoring information with

switching information stored in the switching-table unit; and,

a switch-control unit for controlling paths of optical signals when an erroneous path exists according to the comparison result.

13. A method for monitoring/correcting paths of optical signals in a transparent OXC (optical cross-connect) device of a wavelength-division-multiplexing optical-communication network, the method comprising the steps of:

modulating a plurality of i^{th} frequencies into a plurality of wavelengths and delaying the modulated wavelengths in a time-division manner;

coupling the delayed wavelengths with input-optical signals of the OXC;

performing an optical-switching of the coupled optical signals;

detecting a path-monitoring wavelength from the respective optical-switched signals;

detecting at least one i^{th} frequency and a time-slot position from the detected path-monitoring wavelength; and,

calculating a path of an optical signal from the detected i^{th} frequency and time-slot-position information, comparing the calculated path with predetermined path-switching information, and correcting the path of the input-optical signals according to the comparison result.

14. The method as claimed in claim 13, wherein the detected i^{th} frequency indicates an input port and the time-slot-position information indicates a particular

wavelength of an input-optical signal.

15. A method for monitoring/correcting paths of optical signals in a transparent OXC (optical cross-connect) device of a wavelength-division-multiplexing optical-communication network, the method comprising the steps of:

modulating a sequence of predetermined bit data and delaying the modulated bit data in a time-division manner;

coupling the delayed wavelengths with input-optical signals of the OXC;

performing an optical-switching of the coupled optical signals;

detecting a path-monitoring wavelength from the respective optical-switched signals;

detecting an input-data pattern and a time-slot position from the detected path-monitoring wavelength; and,

calculating a path of an optical signal from the detected input-data pattern and time-slot-position information, comparing the calculated path with predetermined path-switching information, and correcting the path of the input optical signals according to the comparison result.

16. A method for monitoring/correcting the paths of optical signals in a transparent OXC (optical cross-connect) device of a wavelength-division-multiplexing optical-communication network, the method comprising the steps of:

modulating a sequence of CDM codes and delaying the modulated CDM codes in a time-division manner;

coupling the delayed CDM codes with input-optical signals of the OXC;

performing an optical-switching of the coupled optical signals;

detecting a CDM code and a time-slot position from the respective optical-switched signals; and,

calculating a path of an optical signal from the detected CDM codes and time-slot-position information, comparing the calculated path with predetermined path-switching information, and correcting the path of the input-optical signals according to the comparison result.